

## PATENT ABSTRACTS OF JAPAN

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### (54) INK COMPOSITION FOR DISPLAYING HEATING HISTORY

#### (57)Abstract:

**PROBLEM TO BE SOLVED:** To obtain the subject composition capable of providing a technical means of a starting function and a detecting function at the same time in order to conduct the quality control, etc., of a canned drinking water.

**SOLUTION:** This ink composition indicating a heating history contains (A) an electron supplying compound (e.g.; triphenylmethanephthalides, fluorans, spirorans, leucoauramines and rhodamine lactams), (B) an electron accepting compound (e.g.; monophenols, diphenols and triphenols), (C) an oil soluble resin (e.g.; hydrocarbon-based resins, aromatic hydrocarbon-based resins, acrylic acid resins, phenolic resins and ketonic resins), and (D) a solvent (e.g.; aliphatic hydrocarbons, aromatic hydrocarbons, halogenized hydrocarbons' alcohols, ketones, esters, ethers, alcoholic esters, ketonic alcohols, ethereal alcohols, ketonic ethers, ketonic esters and ester ethers).

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CLAIMS

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[Claim(s)]

[Claim 1] The ink constituent which is characterized by including an electron-donative compound and electronic receptiveness compound, dissolved resin, and a solvent and which starts discoloration at predetermined temperature and displays a heating history.

[Claim 2] Ink constituent: a. electron-donative compound according to claim 1 an electron-donative compound and electronic receptiveness compound, dissolved resin, and whose solvent are at least one sort chosen from the following group, respectively -- Triphenylmethane-color phthalides Fluoran, SUPIRO pyrans, leuco auramine, and rhodamine lactams b. electronic receptiveness compound -- Monochrome phenols, Diphenols and TORIFE Norian c. dissolved resin -- Hydrocarbon system resin, Aromatic-hydrocarbon system resin, acrylic-acid system resin, phenol resin, and ketone resin d. -- Aliphatic hydrocarbon Aromatic hydrocarbons, halogenated hydrocarbons, alcohols, ketones, ester, ether, alcoholic ester, ketone alcohols, ether RUKORU, ketone ether, ketone ester, and ester ether. [Claim 3] Ink constituent: a. electron-donative compound [ -- Phenol resin d. / -- Aromatic hydrocarbons and alcohols. ] according to claim 2 an electron-donative compound and electronic receptiveness compound, dissolved resin, and whose solvent are at least one sort chosen from the following group, respectively -- Triphenylmethane-color phthalides and fluoran b. electronic receptiveness compound -- Diphenols c. dissolved resin [Claim 4] The ink constituent according to claim 1 to 3 which are 0.1 - 10.0% of electron-donative compounds, 0.2 - 80.0% of electronic receptiveness compounds, 0.5 - 60.0% of dissolved resin, and 20.0 - 99.2% of solvents on the basis of a sum total weight.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] It begins to discolor at predetermined temperature and this invention relates to the ink constituent which can display a heating history.

[0002]

[Description of the Prior Art] Canned coffee, canned tea (oolong tea, tea, green tea, etc.), and canned soup are warmed by the hot vender of a vending machine in winter (henceforth canned drinks), and they are sold. Within a hot vender, after progress (although it changes with kinds about two - four weeks when short after), deterioration of quality starts, these canned drinks are \*\*\*\*\* (ed) soon, and the object and bird clapper of a claim from a consumer are during a fixed period.

[0003] Selling term management of the canned drinks under keeping warm is performed by measuring the augend of the glucose inside the can correlated with a heating history by the present hot vender. However, since analysis of the amount of glucoses inside a can is performed by requesting a public engine, time and costs tend to start and the situation where the claim which originates in deterioration of quality as a result occurs tends to be caused. Furthermore, it is necessary with enforcement of the Product Liability Law to perform quality control of canned drinks future still more severely.

[0004] a heating start [ in / a hot vender / as the quality control method of canned potable water in a hot vender ] -- an exterior -- a change of some kind is produced (henceforth a start function), exterior still more nearly another change is produced after heating of a fixed period (for example, about two months), and completion of pull-date is shown (it says as a detection function below) -- \*\* -- development of the new means to say is called for

[0005] JP,60-124681,A is indicating "the time indicator which a redox indicator and the matter smothered are made to live into a liquid together, and grows into it." Although this time indicator is equipped with the function similar to the above-mentioned detection function, it does not have the start function, and since it is a liquefied constituent, it cannot be used for quality control of canned potable water in a hot vender.

[0006] JP,57-27918,B is indicating "the ink constituent for displaying the history of the heat-treatment or moist heat treatment in the water bath characterized by containing the microcapsule which made the coloring agent of water solubility or water discoloration nature connote as at least 1 component of a coloring agent into the coat of the polymeric material which may be fused under dry heat or wet heat." It is only only being able to display the existence of heat treatment at a point temporarily, and this ink constituent is not equipped with the start function and the detection function.

[0007]

[Problem(s) to be Solved by the Invention] Therefore, this invention sets it as the main purposes to offer the new technical means equipped with the start function and the detection function for quality control of canned potable water etc.

[0008]

[Means for Solving the Problem] this invention person in manufacture and the circulation stage of

canned drinks A start function is demonstrated, when it did not change but has been arranged in the hot vender of predetermined temperature. And as a result of advancing research variously after predetermined-time progress to obtain the material which demonstrates a detection function, when the specific ink constituent containing an electron-donative compound and an electron-donative compound is printed on the can front face, it finds out that the purpose can be attained and came to complete this invention.

[0009] That is, this invention offers the following ink constituent for a heating history display.

[0010] 1. Ink constituent which is characterized by including electron-donative compound and electronic receptiveness compound, dissolved resin, and solvent and which starts discoloration at predetermined temperature and displays heating history.

[0011] 2. Electron-donative Compound and Electronic Receptiveness Compound, Dissolved Resin, and Solvent Ink constituent: a. electron-donative compound according to claim 1 which is at least one sort chosen from the following group, respectively -- Triphenylmethane-color phthalides Fluoran, SUPIRO pyrans, leuco auramine, and rhodamine lactams b. electronic receptiveness compound -- Monochrome phenols, Diphenols and TORIFE Norian c. dissolved resin -- Hydrocarbon system resin, Aromatic-hydrocarbon system resin, acrylic-acid system resin, phenol resin, and ketone resin d. -- Aliphatic hydrocarbon Aromatic hydrocarbons, halogenated hydrocarbons, alcohols, and ketones Ester, ether, alcoholic ester, ketone alcohols, An ether RUKORU, ketone ether, ketone ester, and ester ether 3. electron-donative compound, An electronic receptiveness compound, dissolved resin, and a solvent it is chosen from the following group, respectively, if few An ink constituent given in the above-mentioned term 2 which are one sort of \*\*: a. electron-donative compound [ -- Phenol resin d. / -- It is based on an aromatic-hydrocarbons and alcohols 4. sum total weight. ] -- Triphenylmethane-color phthalides and fluoran b. electronic receptiveness compound -- Diphenols c. dissolved resin An ink constituent given in either of the above-mentioned terms 1-3 which are 0.1 - 10.0% of electron-donative compounds, 0.2 - 80.0% of electronic receptiveness compounds, 0.5 - 60.0% of dissolved resin, and 20.0 - 99.2% of solvents.

[0012]

[The mode of implementation of invention] The electron-donative compound (coloring agent) used in this invention constituent needs that it is non-volatile. Especially as such an electron-donative compound, although not limited, the following are illustrated.

[0013] \* Triphenylmethane-color phthalides -- 3 and 3-screw (p-dimethylamino phenyl)-phthalide, A 3 and 3-screw (p-dimethylamino phenyl)-6-dimethylamino phthalide, A 3 and 3-screw (p-dimethylamino phenyl)-6-chloro phthalide, A 3-(2'- hydroxy-4'-dimethylamino phenyl)-3-(2' - methoxy -5'-chlorophenyl) phthalide, A 3-(2'- hydroxy-4'-dimethylamino phenyl)-3-(2' - methoxy -5'-nitrophenyl) phthalide, A 3-(2'- hydroxy-4'-diethylaminophenyl)-3-(2' - methoxy -5'-methylphenyl) phthalide, a 3-(2' - methoxy -4'-dimethylamino phenyl)-3-(2'-hydroxy-4' - chloro -5'-methylphenyl) phthalide, etc.

[0014] \* Fluoran -- 3-cyclohexylamino-6-chlorofluoran, 3-dimethylamino -5, 7-dimethyl fluoran, 3-diethylamino-7-chlorofluoran, 3-diethylamino-7-methyl fluoran, 3-diethylamino-6-methyl-7-chlorofluoran, 3-(N-P-tolyl-N-ethylamino)-6-methyl-7-anilino-fluoran, 3-pyrrolidino-6-methyl-7-anilino-fluoran, 3-diethylamino -7, 8-bends ORAN, 2-{N-(3'-trifluoromethyl phenyl) AMINO}-diethylamino fluoran, 3-diethylamino-7-(o-chloroanilino) fluoran, 3-dibutylamino-7-(o-chloroanilino) fluoran, 3-N-methyl - N-amyl amino-6-methyl-7-anilino-fluoran, eye 3-N- \*\*\*\*-N-cyclohexylamino-6-methyl-7-anilino-fluoran -- 3-diethylamino-6-methyl-7-anilino-fluoran, 3-(N and N-diethylamino)-5-methyl-7-(N and N-dibenzylamino) fluoran, 3-diethylamino-5-chloro-7-(N-TORIFURUOROMECHIRUAMINO) fluoran, 3-diethylamino-5-chloro-7-(alpha-phenyl ethylamino) fluoran, 3-(N-ethyl-p-torr IJINO)-7-(alpha-phenyl ethylamino) fluoran, 3-diethylamino-7-(o-methoxycarbonyl phenylamino) fluoran, 3-diethylamino-5-methyl-7-(alpha-phenyl ethylamino) fluoran, 3-diethylamino-7-piperidino fluoran, 2-chloro-3-(N-methyl torr IJINO)-7-(p-n-butylanilino) fluoran, 3-(N-methyl-N-isopropylamino)-6-methyl-7-anilino-fluoran, 3-butylamino-6-methyl-7-anilino-fluoran, 3-N-ethyl-N-(2-ethoxy propyl) amino-6-methyl-7-anilino-fluoran, 3-(N-benzyl-N-cyclohexylamino)-5 and 6-benzo-7-alpha-naphthyl amino-4'-BUROMO fluoran -- 3-diethylamino-6-chloro-7-anilino-fluoran and 3-

diethylamino-6-methyl-MECHISHIJINO-4' and 5' - benzo fluoran -- 3-N-methyl-N-isobutyl-6-methyl-7-anilino-fluoran, 3-N-ethyl-N-isoamyl-6-methyl-7-anilino-fluoran, 3-diethylamino-6-methyl-7-(2', 5'-dimethyl ANIRINO) fluoran, etc.

[0015] \* SUPIRO pyrans -- A 6'-chloro-8'-methoxy-benzoin DORINO-SUPIRO pyran, 6'-BUROMO-3'-methoxy-benzoin DORINO-SUPIRO pyran, etc.

[0016] \* Rhodamines -- 2-{3, 6-screw (diethylamino)-9-(o-chloroanilino) xanthyl benzoic-acid lactam, etc.

[0017] \* Leuco auramine -- Benzoyl leuco methylene blue etc.

[0018] In the above-mentioned electron-donative compound (coloring agent), triphenylmethane-color phthalides and fluoran are more desirable.

[0019] The electronic receptiveness compound (developer) used in this invention constituent gives a start function and a detection function to a constituent under the combined use with an electron-donative compound. Especially as such an electronic receptiveness compound, although not limited, the following are illustrated.

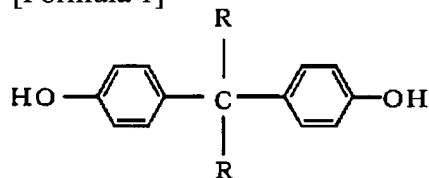
[0020] 1. Monochrome phenols \* monochrome hydroxyphenyl system -- A 4-hydroxy benzophenone, p-hydroxyphenyl, a 4-hydroxy diphenylamine, p-cumyl phenol, p-phenol sulfonamide, a 4-hydroxy benzenesulfonic-acid methyl, 4-hydroxy phenyl methyl ketone, etc.

[0021] \* -- Phenyl carboxylic-acid system -- 2-hydroxy dimethyl-phthalate ester, 2-hydroxy diphenyl-phthalate ester, the 4-hydroxy salicylanilide, 5-benzyl salicylanilide, etc.

[0022] \* -- Monochrome hydroxy naphthalene system -- The alpha-naphthol, the beta-naphthol, a 2-methyl-1-naphthol, a 1-oxy--2-naphthoic acid, a 2-oxy--3-naphthoic acid, 2-ASEAN bedding, a 8-amino-2-naphthol, hydroxy naphthalene sulfonic acid, etc.

[0023] 2. Diphenols \* -- Bisphenol system. [0024]

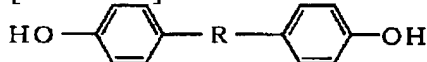
[Formula 1]



[0025] R shows H or the alkyl of C1-C10 among a formula.

[0026]

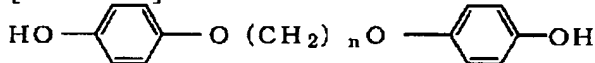
[Formula 2]



[0027] R shows the alkylene of H, C1-C10, the cycloalkyl of C1-C10, or an aralkyl among a formula.

[0028]

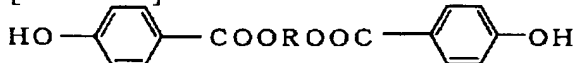
[Formula 3]



[0029] n shows the integer of 1-10 among a formula.

[0030]

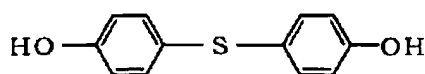
[Formula 4]



[0031] R shows the alkylene of C1-C10 among a formula.

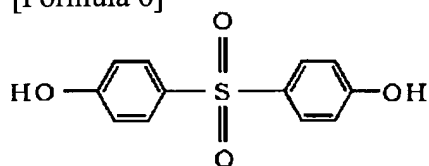
[0032]

[Formula 5]



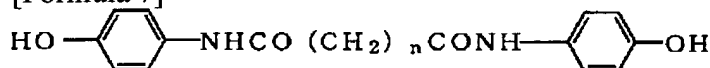
[0033]

[Formula 6]



[0034]

[Formula 7]

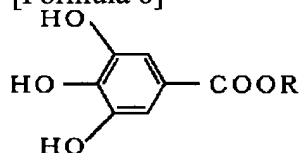


[0035] R shows the alkylene of C1-C10 among a formula.

[0036] \* Hydroxy naphthalene system -- 1, 3-dihydroxynaphthalene, 1, 4-dihydroxynaphthalene, 1, 4-dihydroxynaphthalene monochrome benzyl ether, 1, 4-dihydroxynaphthalene propyl ether, etc.

[0037] 3. TORIFE Norians [0038]

[Formula 8]



[0039] R shows the alkyl of C1-C10 among a formula.

[0040] In the above-mentioned electronic receptiveness compound (developer), a bisphenol system compound is more desirable.

[0041] The resin used in this invention constituent gives moderate viscosity while giving the adhesion to printed matter-ed to an ink constituent. Moreover, a resin needs to present acidity in order not to check the start function and detection function of a constituent. Especially as such a resin, although not restricted, the following are illustrated.

[0042] \* Hydrocarbon system resin -- A petroleum resin, a terpene resin, polyethylene, polypropylene, a polybutene, a polyisobutylene, a cumarone indene resin, polystyrol, etc.

[0043] \* Aromatic-hydrocarbon resin -- A xylene resin, a toluene resin, alkylbenzene resin, etc.

[0044] \* Acrylic-acid system resin -- Polyacrylic ester, a polymethacrylic acid ester, the poly acrylic nitril, a polyacrylic acid, poly acrylamide, etc.

[0045] \* Amino resin -- A urea-resin, melamine resin, amide resin, etc.

[0046] \* In addition to this, they are -- phenol resin, ketone resin, etc.

[0047] In these resins, phenol resin is more desirable.

[0048] After the solvent used in this invention constituent dissolves an electron-donative compound and electronic receptiveness compound and a resin and prints a constituent to a printed side, it needs to have the moderate volatility which vaporizes in a short time. Moreover, in the coloring reaction of an electron-donative compound and an electronic receptiveness compound, it is necessary to demonstrate desensitization nature. The following are illustrated although not limited especially as such a solvent.

[0049] \* Aliphatic hydrocarbon -- A gasoline, benzine, a mineral spirit, a naphtha, petroleum naphtha, etc.

[0050] \* Aromatic hydrocarbons -- Benzene, toluene, a xylene, a decalin, a tetralin, p-cymene, etc.

[0051] \* Halogenated hydrocarbons -- A trichloroethylene, a par chloroethylene, chloroform, a carbon tetrachloride, a monochrome bromobenzene, a monochlorobenzene, dichlorobenzene, etc.

[0052] \* Alcohols -- Amyl alcohol, ethyl alcohol, isopropyl alcohol, 2-ethyl butyl alcohol, 2-ethylhexyl

alcohol, cyclohexyl alcohol, methyl alcohol, a methyl amyl alcohol, benzyl alcohol, butyl alcohol, etc.  
 [0053] \* Ketones -- An acetone, an acetonylacetone, JIASETO alcohol, a diisobutyl ketone, a diethyl ketone, a dipropyl ketone, a methyl amyl ketone, a methyl butyl ketone, a methylcyclohexanone, a methyl dipropyl ketone, a methyl ethyl ketone, a methyl n-hexyl ketone, a methyl isobutyl ketone, a methyl propyl ketone, MEJISHIRU oxide, etc.

[0054] \* Ester -- Acetic ester, butylate, propionic-acid ester, formate, etc.

[0055] \* Ether -- An isopropyl ether, ethyl ether, diethylene-glycol diethylether, ethylene glycol diethylether, butyl ether, etc.

[0056] \* Alcoholic ester -- A butyl lactate, a lactic-acid isopropyl, an ethyl lactate, an oxy-ethyl propionate, diethyl maleate, etc.

[0057] \* Ketone alcohol -- Acetonyl alcohol, diacetone alcohol, a dihydroxyacetone, pill building alcohol, etc.

[0058] \* Ether alcohols -- An ethylene glycol isopropyl ether, a glycidol, ethylene glycol monoethyl ether, a diethylene glycol monoethyl ether, a glycol ether, an ethylene glycol monochrome benzyl ether, the diethylene-glycol monomethyl ether, an ethylene glycol monomethyl ether, the triethylene-glycol monoethyl ether, etc.

[0059] \* Ketone ether -- Acetal ethyl ether, acetonyl methanol ethyl ether, methyl ethoxy ethyl ether, etc.

[0060] \* Ketone ester -- An ethyl acetoacetate, pyruvic-acid ethyl, etc.

[0061] \* Ester ether -- A butyl-acetate butyl kaavie toll, an acetic-acid butyl cellosolve, an acetic-acid kaavie toll, a cellosolve acetate, acetic-acid 3-butoxy butyl, a methyl-acetate kaavie toll, acetic-acid methyl cellosolve, etc.

[0062] In these solvents, an aromatic hydrocarbon and alcohols are more desirable. As for other solvents, in an ink constituent, it is desirable to use it in order to adjust the volatility of an aromatic hydrocarbon and/or alcohols.

[0063] the ink constituent for a heating history display by this invention -- setting -- criteria [ weight / sum total ] -- carrying out -- 0.1 - 10.0% (preferably 0.5 - 10.0%) of electron-donative compounds, 0.2 - 80.0% (preferably 1.0 - 50.0%) of electronic receptiveness compounds, 0.5 - 60.0% (preferably 1.0 - 40.0%) of resins, and 20.0 - 99.2% of solvents (preferably 30.0 - 95.0%) -- it carries out comparatively

[0064] Since coloring nature falls to there being a danger that the deposit will arise in too little when the amount of an electron-donative compound (coloring agent) is superfluous, it is desirable to neither of the cases.

[0065] To the ability not to fully demonstrate the detection function to display the end of pull-date clearly, since ground coloring remains while producing the deposit when the amount of an electronic receptiveness compound (developer) is superfluous, when too little, the coloring concentration after heating becomes low and a start function cannot fully demonstrate. In this invention, an ink paint film can adjust the period which demonstrates a detection function by adjusting the amount of an electronic receptiveness compound (developer) suitably within the limits of the above.

[0066] When the amount of a resin is superfluous, in too little, the adhesive property over printed matter-ed falls to an ink constituent gelling.

[0067] Although the amount of a solvent is not limited especially originally as long as an ink constituent can print to printed matter-ed, considering as the above-mentioned range practical is desirable.

[0068] In this invention, optimum dose combination of various kinds of additives usually added by the ink constituent can be carried out if needed. As such an additive, a coloring agent, the electric charge matter, a defoaming agent, a dryer, a bulking agent, a leveling agent, a thixotropic agent, etc. are illustrated.

[0069] What is necessary is not to limit especially the manufacture method of the ink constituent by this invention, but just to perform it by the same method as a common ink constituent. For example, after dissolving a resin in a solvent first, an electron-donative compound and an electronic receptiveness compound are added, and it kneads further, and considers as a uniform ink constituent. It is desirable to perform kneading using a ball mill, a sand mill, attritor, etc. according to a conventional method in the

case of hypoviscosity ink (rotogravure ink etc.), and to carry out using a roll mill etc. in the case of hyperviscous ink (the planoconvex version ink etc.).

[0070]

[Effect of the Invention] Although it does not discolor in process of storage and circulation in printing on printed matter-ed with the ink constituent by this invention, it colors by heating at predetermined temperature (a start function is demonstrated), and the ink paint film equipped with the unique function which are other colors to discolor (for a detection function to be demonstrated), after progress during a fixed period is formed. Therefore, the ink constituent by this invention is very useful as a charge of display material of the pull-date of the canned drinks which are held in a hot vender and sold in the state of keeping warm.

[0071] Furthermore, the ink constituent by this invention is very useful as quality control or the guarantee means of all the goods used for a fixed period after heating through storage and circulation.

[0072]

[Example] An example and the example of comparison are shown below, and the place by which it is characterized [ of this invention ] is clarified further.

[0073] In the following examples and examples of comparison, the retention of the discoloration color difference after maintenance estimated the heating history display function of each ink constituent during a fixed period heating start before. That is, the chromaticity (Lab) in the ordinary temperature of printed matter-ed was set to L1, a1, and b1, the coloring chromaticity in the ordinary temperature before heating of an ink paint film was set to LS, aS, and bS, and it asked for the color difference retention (%) shown by the following formula considering the coloring chromaticity in the elevated-temperature maintenance state after heating of an ink paint film as LT, aT, and bT.

[0074]

[Equation 1]

色差保持率 (%)

$$= \frac{\sqrt{(L T - L 1)^2 + (a T - a 1)^2 + (b T - b 1)^2}}{\sqrt{(L S - L 1)^2 + (a S - a 1)^2 + (b S - b 1)^2}}$$

[0075] An adhesive property is JIS. 5400 According to 8.5.3 "the X cut tape method", the adhesive tape was stuck and pulled to the ink paint film on printed matter-ed, and the existence of ablation of a paint film estimated on the following criteria. However, the cut of a paint film was not performed.

[0076] Fitness: With no ablation. Defect: Those with ablation.

[0077] Moreover, the detail of the material used in each example is as follows.

[0078] I. Electron-donative compound (coloring agent)

a. 3 3-screw (p-dimethylamino phenyl)-6-dimethylamino phthalide b.2-(2-chloroanilino)-6-butylamino fluoran II. electronic receptiveness compound (developer)

a. The methylene bisphenol b.4, the 4'-ethylidene bisphenol c.4, the 4'- (2-ECHIRUHE xylidene) bisphenol d.p-phenol sulfonamide e. hydroquinone f.4, 4', 4''-methylidyne tris phenol g.3, 5-dihydroxy benzoic-acid h. para-hydroxybenzoic-acid benzyl i. benzoic-acid zinc j. octadecanamide III. resin a.

rosin denaturation phenol resin (product made from "TAMANORU 353" Arakawa Chemical industry)

b. Aromatic-hydrocarbon resin (product made from "Nippon Oil Polymer 120" Nippon Oil Chemistry)

c. Bisphenol A type epoxy resin (product made from "Epicoat 828" oil-ized Shell Industry)

IV. solvent a. xylene b. ethanol c. isopropanol V. additive a. red color (product made from "oil scaw let 308s" Orient Chemical industry)

b. Electric charge matter; lithium-chloride c. CHIKISOTORO pick agent (product made from "BYK-P104" big KEMI)

d. Defoaming agent (product made from "BYK-P104" big KEMI)

e. Dryer (oxidization dryness accelerator catalyst); it is a printing machine for cans ("impulse jet", made in a union corporation.) about the ink constituent (a numeric value shows weight %) shown in Table 1 of



the naphthenic-acid cobalt examples 1-5 and the example 1 of comparison - 8 following. After printing by 50 micrometers of nozzle diameters, and 32 dots per inch at the bottom of the can for potable water made from stainless steel (diameter of 59mm), it dried, archiving was carried out on the temperature conditions shown in Table 2, and color difference retention and the adhesion of an ink paint film were measured. Color difference retention is collectively shown in Table 2.

[0079] In addition, although the adhesion of an ink paint film was good about the ink of examples 1-5 and the examples 1-6 of comparison, in the example 7 of comparison, ink gelled it, and it was not colored in the example 8 of comparison.

[0080]

[Table 1]

	着色剂	顔色剂	樹脂	溶 剂	添 加 剂
実施例 1	a:1.5	a:4.5	a:10.0	a:73.3+b:10.0	a:0.2+c:0.5
2	a:1.5	a:7.5	a:10.0	a:70.5+b:10.0	a:0.2+c:0.3
3	b:1.5	b:4.5	a:10.0	a:73.3+b:10.0	a:0.2+c:0.5
4	b:1.5	c:4.5	a:10.0	a:73.3+b:10.0	a:0.2+c:0.5
5	a:1.5	d:4.5	a:10.0	a:73.3+b:10.0	a:0.2+c:0.5
比較例 1	a:1.5	e:4.5	a:10.0	a:73.3+b:10.0	a:0.2+c:0.5
2	a:1.5	f:4.5	a:10.0	a:73.3+b:10.0	a:0.2+c:0.5
3	b:1.5	g:4.5	a:10.0	a:73.3+b:10.0	a:0.2+c:0.5
4	b:1.5	h:4.5	a:10.0	a:73.3+b:10.0	a:0.2+c:0.5
5	b:1.5	i:4.5	a:10.0	a:73.3+b:10.0	a:0.2+c:0.5
6	b:1.5	j:4.5	a:10.0	a:73.3+b:10.0	a:0.2+c:0.5
7	a:1.5	a:4.5	b:10.0	a:73.3+b:10.0	a:0.2+c:0.5
8	b:1.5	a:4.5	c:10.0	a:73.3+b:10.0	a:0.2+c:0.5

[0081]

[Table 2]

色差保持率 (%)										
3 0℃			4 5℃			6 0℃				
	15日	30日	60日	15日	30日	60日	15日	30日	60日	備 考
実施例 1	100	100	100	100	98	92	80	42	18	紫→赤; 60℃スタート機能
2	100	100	100	100	100	100	84	78	70	紫→赤; 60℃スタート機能
3	100	100	100	100	100	85	82	51	20	黒→赤; 60℃スタート機能
4	100	100	100	100	100	98	84	63	91	黒→赤; 60℃スタート機能
5	100	100	100	93	78	52	63	32	18	黒→赤; 45℃スタート機能
比較例 1	78	54	40	-	-	-	-	-	-	スタート機能なし
2	87	64	53	74	54	33	63	46	20	スタート機能なし
3	97	95	91	96	95	89	98	95	90	スタート機能なし
4	54	42	39	-	-	-	-	-	-	スタート機能なし
5	84	80	72	-	-	-	-	-	-	スタート機能なし
6	100	100	100	100	100	100	100	100	100	スタート機能; 検知機能なし
7	-	-	-	-	-	-	-	-	-	インキゲル化
8	-	-	-	-	-	-	-	-	-	発色せず

[0082] After using the electric charge type ink jet printer ("Fx-2632", Hitachi Make, 60 micrometers of nozzle diameters, 35 dots per inch) and printing the ink constituent shown in six to example 9 table 3 at the bottom of the can for potable water made from stainless steel (diameter of 59mm), it dried, archiving was carried out on the temperature conditions shown in Table 4, and color difference retention was measured. A result is shown in Table 4. In any case, the adhesion of an ink paint film was good.

[0083]

[Table 3]

	着色剤	顔色剤	樹脂	溶 剤	添 加 剤
実施例 6	a:1.5	a:3.0	a:6.0	a:60.1+b:10.0 +c:18.0	a:0.2+b:1.0 +c:0.2
7	b:1.5	b:3.0	a:6.0	a:60.1+b:10.0 +c:18.0	a:0.2+c:1.0 +c:0.2
8	b:1.5	c:3.0	a:6.0	a:60.1+b:10.0 +c:18.0	a:0.2+b:1.0 +c:0.2
9	b:1.5	d:3.0	a:6.0	a:60.1+b:10.0 +c:18.0	a:0.2+b:1.0 +c:0.2
10	a:1.5	a:4.5	a:30.0	a:50.1+b:6.0 +c:6.0	a:0.2+c:1.2 +e:0.5
11	a:1.5	a:4.5	a:15.0	a:68.0+b:10.0	a:0.2+c:0.5 +e:0.3

[0084]

[Table 4]

		色差保持率 (%)									備 考
		30℃			45℃			60℃			
		15日	30日	60日	15日	30日	60日	15日	30日	60日	
実施例 6		100	100	100	100	95	89	53	18	12	黒→赤; 60℃スタート機能
7		100	100	100	100	100	100	45	21	13	紫→赤; 60℃スタート機能
8		100	100	100	100	100	100	63	32	15	紫→赤; 60℃スタート機能
9		100	100	100	78	54	24	42	14	12	紫→赤; 45℃スタート機能
10		100	100	100	100	100	100	89	53	27	黒→赤; 60℃スタート機能
11		100	100	100	61	43	31	36	12	11	黒→赤; 45℃スタート機能

[0085] Except having printed directly the ink constituent shown in example 10 table 3 with the can by the dry offset method, it printed like the example 1, and it dried, archiving was carried out on the temperature conditions shown in Table 4, and color difference retention was measured. A result is collectively shown in Table 4. The adhesion of an ink paint film was good.

[0086] The ink constituent shown in example 11 table 3 was boiled with gravure, after printing and drying on a seal more, it stuck on the can by the labeler, archiving was carried out on the temperature conditions shown in Table 4, and color difference retention was measured. A result is collectively shown in Table 4.

[Translation done.]

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TECHNICAL FIELD

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[The technical field to which invention belongs] It begins to discolor at predetermined temperature and this invention relates to the ink constituent which can display a heating history.

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[Translation done.]